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INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ^b : A47K 7/02		A1	(11) International Publication Number: WO 97/24053
			(43) International Publication Date: 10 July 1997 (10.07.97)
(21) International Application Number: PCT/EP96/05007		(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, HU, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, TJ, TM, TR, TT, UA, UG, UZ, VN, ARIPO patent (KE, LS, MW, SD, SZ, UG), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG).	
(22) International Filing Date: 11 November 1996 (11.11.96)		Published With international search report.	
(30) Priority Data: 08/581,411 29 December 1995 (29.12.95) US			
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(54) Title: WASHING SYSTEM			
(57) Abstract A new washing system which employs an implement which is durable and suitable for convenient use with a single hand. The system comprises a cleansing agent and a separate reticulated sponge material. Preferably the cleansing agent includes a foaming surfactant and a skin conditioner. The sponge is preferably made of a synthetic polymer.			

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WASHING SYSTEMBackground of the Invention

- 5 Liquid personal washing cleansers have recently been gaining in popularity. A difficulty with their use is that there is lacking a solid, tangible washing implement, such as a soap bar, which the consumer is accustomed to use. Particularly is the absence of such an implement likely to be noticed in
10 the bath or shower. Also, it would be beneficial to improve the lathering of the liquid cleansers. Washing implements should be easy and convenient to use, preferably without the need to involve both hands.
- 15 Campagnoli, U.S. Patent No. 5,144,744 discloses a diamond-mesh polyethylene sponge obtained by stretching a plurality of tubes, binding all of the tubes together near a common center of all of the stretched tubes and releasing all the tubes from their stretched condition whereby the tubes
20 through their resiliency rebound into a rounded sponge shape. Rounded sponge shaped implements made from diamond mesh are sometimes perceived as appearing excessively "frilly" and as less likely to appeal to men than to women.
- 25 Hudson et al., U.S. Patent No. 5,295,280 discloses a washing device for scrubbing the body which includes an elongate washing member formed of a plurality of interlooped box-like links. The washing device includes gripping handles in the form of loops at each end of the washing device. An object
30 of the invention is to provide a washing device for scrubbing the body which involves both hands of the person washing and therefore can provide enhanced scrubbing action.

Sanford, U.S. Patent No. 4,462,135 discloses a cleaning and abrasive scrubber which is made in part of numerous layers of netting mesh polymeric material.

5 WO 95/00116 discloses a system for cleaning the skin which comprises a diamond mesh sponge and a liquid cleansing and moisturizing composition said to have excellent lather.

10 A problem encountered with meshed washing implements is that after several washings they start to lose their shape.

Wittes U.S. Patent No. 4,627,129 is directed to a sponge comprised of reticulated polyurethane foam and having a flat washing surface and a round back.

15 In one embodiment, the device is used as a bathing sponge. The foam preferably has a density of 1.8 pounds per cubic foot and a cell count of 40 to 50 cells per square inch. The inventor provides little or no guidance as to the types of compositions with which the sponge should be used.

20 Davis U.S. Patent No. 5,058,233 discloses a cleaning device for bath tubs, shower enclosures, swimming pools and the like which may include a reticulated sponge having 50-80 pores per linear inch. The device includes a support block attached in
25 a cavity formed in a sponge block.

Andros U.S. Patent No. 5,311,634 discloses disc shaped cleaning pads for use on a cleaning apparatus consisting of a supporting core to which a sponge is affixed. The sponge is
30 a microporous material made from a hydroxylated polymer. The sponge of Example 1 is said to be a microporous, soft, reticulated matrix of cross linked polyvinyl alcohol.

Lutz et al. in U.S. Patent No. 4,474,678 use a test sponge
35 cut from a sheet of fine-celled, reticulated, open-pored

polyurethane foam having 80 pores per lineal inch to test their cleaning compositions. Applications in laundry, dishwashing and hard surface cleaning are mentioned.

5 Avery U.S. Patent No. 4,183,684 relates to a fluid dispensing unit having a housing including fluid-containing ampoules and porous pads. The porous pad can include a sponge layer of reticulated open-cell polyurethane foam material. Fluids which it is said can be dispensed include medicaments,
10 cosmetic, polish, antiseptic or detergent compositions. The dispensing unit is said to be usable for, e.g., applying medicaments or cleansing wounds.

15 Gaiser U.S. Patent No. 4,174,109 discloses a hand grip sleeve for hand tools and the like made from reticulated open cell foam.

Guthrie et al. US Patent No. 4,160,076 discloses hydrophilic crosslinked polyurethane foams which are said to simulate
20 natural sponges.

Bedford U.S. Patent No. 4,866,806 discloses a surgical scrub sponge. The sponge is impregnated with an antiseptic cleansing solution. Three layers of foam material are used.
25 One layer is a reticulated, open-cell foam.

MacRae U.S. Patent No. 4,344,930 discloses a sponge containing an impregnated skin care composition. The patentees claim as their essential inventive concept the
30 inclusion of an emollient composition into a water reactant prior to its reaction with a prepolymer to produce the reticulated foam. The emollient materials are generally organic oils or unctuous and are said to be well known for conditioning, relaxing softening and/or soothing the skin.

Examples include petrolatum and silicones. According to a preferred embodiment, a surfactant is included.

- 5 Akroingold U.S. Patent No. 3,949,137 is directed to gel
impregnated sponges. The sponge may be fully or partially
reticulated. The fully reticulated sponge would have between
about 70 and 200 pores per square inch whereas the partially
reticulated sponge would have between about 30 and 200 pores
per square inch. The gel material may be soap or synthetic
10 detergent. The article may be used for cleaning the skin.
In Example 1, the gel material includes miranol acid,
ricinoleic acid, diethanolamine, sodium stearate and sodium
lauryl sulfate.
- 15 Linenfelser U.S. Patent No. 3,857,133 discloses a sponge
formed basically of a polyurethane ester foam having a sponge
body of sponge like consistency and a layer of open celled
foam.
- 20 Richter et al. U.S. Patent No. 3,566,871 discloses a
reticulated, polyurethane sponge adapted for medical usage
which employs a non-foaming surfactant and a hygroscopic
agent, which may be glycerine, propylene glycol or diethylene
glycol.
- 25 Morganti U.S. Patent No. 4,834,734, in discussing the
background of the invention, mentions that attempts have been
made to use soluble collagen in glycol solutions on a
reticulated collagen support. The invention includes a
30 spongy collagen support matrix comprising reticulated
collagen, and a water-soluble non-reticulated collagen.
- 35 Strickman et al. U.S. Patent No. 4,421,526 discloses
polyurethane foam cleaning pads containing abrasives and
detergents. The pads are made by reacting prepolymer,

catalyst abrasive and other additives in a two step mixing process. Embodiments which are ammonia releasing and oxygen releasing are included.

5 Hendrickson et al. U.S. Patent No. 4,254,139 discloses an article for dispensing conditioner for fibrous materials in a laundry washer or dryer. A layer of open celled polyurethane may be used. The article also comprises a base sheet of magnetized rubbery polymer for engaging the internal metal
10 surface of a washing or drying apparatus. Usually the article as commercially supplied will contain the conditioner. If not, it may be added to the sorptive layer. Various conditioning agents, including mixtures of nonionic surface active conditioning agents with cationic or anionic
15 surface active agents are mentioned.

Summary of the Invention

20 A new washing system has been developed which employs an implement which is durable and suitable for convenient use with a single hand. The system comprises a cleansing agent, which may include a foaming surfactant and a skin conditioner, and a separate sponge material, which is generally a reticulated sponge. The sponge is preferably
25 made of a synthetic polymer.

The reticulations of the sponge form passageways which can absorb water and soap and/or other constituents of the cleansing agent. The invention therefore provides a washing
30 implement made from reticulated sponge which is convenient for use as a washing implement with a single hand and yet is less "frilly" in appearance than some previous washing implements such as poufs.

It will be appreciated that the washing implement of the invention will be able to absorb liquid like other sponges. It is believed that the sponge of the invention when used together with the cleanser enables the user to reach
5 difficult body parts. Also, as suggested for prior sponges, the lathering of the cleanser may be enhanced.

While most of the sponges in accordance with the invention will be reticulated, sponges made of certain materials need
10 not be. Thus, sponges made from metallocene polyethylene, whether reticulated or non-reticulated, may be employed.

In a preferred embodiment, the sponge is in the shape of a soap or cleansing bar.
15

The cleansing agent can take various forms, e.g., a liquid, a solid or a gel. For instance, the cleansing agent may be a shower gel or a liquid or solid soap.

It has also been discovered that metallocene polyethylene sponges, whether reticulated or not, may advantageously be
20 used in the above washing systems.

The washing system preferably does not include a base or
25 handle, although a flexible strap may optionally be included.

For a more complete understanding of the above and other features and advantages of the invention, reference should be made to the following detailed description of the preferred
30 embodiments and to the accompanying drawings.

Brief Description of the Drawings

Fig. 1 is a perspective view of the washing implement of the
35 invention.

Fig. 2 is a top plan view of an alternate embodiment of the washing implement.

5 Fig. 3 is a cross section along the lines 3-3 of the embodiment of Fig. 2.

Fig. 4 is a top plan view of a second alternate embodiment of the washing implement.

10 Fig. 5 is a top plan view of a third alternate embodiment of the washing implement.

Fig. 6 is a top plan view of a fourth alternate embodiment of the washing implement.

15 Fig. 7 is a top plan view of a fifth alternate embodiment of the washing implement.

Fig. 8 is a top plan view of a sixth alternate embodiment of the washing implement.

Fig. 9 is a cross section of a seventh alternate embodiment of the washing implement.

25 Fig. 10 is a cross section of an eighth alternate embodiment of the washing implement.

Detailed Description of the Invention

30 Referring to Fig. 1, the washing implement 10 is a sponge formed from a reticulated foam. Preferably the foam is made from a synthetic polymer. The foam is preferably within the pore size range of 10 to about 100 pores per linear inch, especially from 10 to 60 pores per linear inch. Foams are
35 available from companies such as Scott Paper Company of

Chester, PA. Methods for reticulation of open celled plastic foams are described in US Patent Nos. 3,475,525 and 3,476,933, which are incorporated by reference herein.

5 The term "reticulated sponges" as used herein does not encompass sponges made from one or more layers of diamond mesh materials. The diamond mesh layers are essentially two dimensional materials without an appreciable thickness. In contrast, the sponges of the invention have an appreciable
10 thickness and generally will have no dimension less than 0.5 cm, and preferably no dimension less than 1 cm.

It may be desirable to vary the pore size to influence the formation of foam. For an immediate transfer of foam, a
15 large cell size of 40 to 90 cells per square inch, especially from 40 to 70, may be used. For intermediate foam transfer, 91 to 145, especially from 100 to 130 cells per square inch may be used. For long lasting foam retention, from 146 to 200, particularly from 170 to 200 cells per square inch may
20 be employed.

It may also be desirable to include varied pore sizes on the sponge. For instance, the top surface of the sponge may have cells within one of the above ranges, eg designed for
25 immediate transfer and the bottom surface may have cells within a different range, e.g., designed for long lasting foam retention. For instance, this may be achieved by laminating 2 or more layers of sponge together, each layer having a different pore size.

30 Foams which may be reticulated to form the washing implement in accordance with the invention include polyurethane, polyester, polyethylene, polyether, polyester base urethane, base urethane, metallocene polyethylene, and polyolefins
35 such as polypropylene, silicate foams, ceramic foams, latex

and natural rubber foams and cellulose sponges. Polyether base urethane reticulated foams are particularly preferred because of their enhanced resistance to oils, moisture and solvents. Polyvinyl alcohol may also be used. Metallocene polyethylene is available from Sentinel Products Corp. of Hyannis, MA 02601.

Pore diameters may, for example, be in the range of 300-400 microns.

Metallocene polyethylene sponges, both reticulated and non-reticulated, may be used in the washing system of the invention. Also, the metallocene polyethylene of such sponges may be blended with other polymers.

It may be desirable to include within the polymeric material of which the sponge is made a plasticizer such as high molecular weight esters such as phthalates, phosphates, glycolates, adipates, sebacates, as well as ketones, amides, nitriles, sulfonamides, and low molecular weight polymers. The plasticizers may impart sufficient softness to provide a smoother feel on the skin of the user.

Washing implement 10, preferably does not include a handle, although one may be used if desired. During use it can be expected that the user will hold the implement in a single hand and move the sponge material over the surface of the body for cleansing. The interior of the sponge can accommodate a substantial amount of water or liquid cleanser, which can be squeezed from the sponge as desired.

The washing implement is flexible and has a mild abrasive surface for gently scrubbing different portions of the body.

The porosity of the sponge permits water and other cleansing liquids to penetrate the surface of the implement into the interior.

5 Preferably the sponge of the invention is used in conjunction with a liquid personal wash cleaning formulation which includes a surfactant. Desirably the cleaning formulation also includes a skin conditioning and moisturizing ingredient. The surfactant should be a relatively mild
10 surfactant suitable for washing human skin and may be, e.g., an anionic, amphoteric, cationic or nonionic surfactant. It is preferred that the surfactant is a foaming surfactant. Among the mild surfactants which may be used are cocamidopropyl betaine, sodium cocoylisethionate and mild
15 soap. Among other surfactants which may be used are soap and sodium laureth sulfate.

Preferably surfactants are employed such that the surfactant, if used alone, or the surfactant mixture is
20 milder than would be soap itself as measured by the zein solubilization test (soap yields 80% zein solubilized). Preferably the zein solubilization is in the range of 10-60%.

Among suitable anionic co-actives are the alkyl ether
25 sulfates, acyl isethionates, alkyl ether sulfonates, sarcosinates, sulfosuccinates, taurates and combinations thereof. Among suitable amphoteric co-actives may be included alkylbetaines, amidopropyl betaines, amidopropyl sultaines and combinations thereof.

30 Alkyl ether sulfates used in the present invention may be of the general formula $R-(OCH_2CH_2)_nOSO_3-M^+$ wherein R ranges from C_8-C_{20} alkyl, preferably $C_{12}-C_{18}$ alkyl, n is an integer from 1 to 40, preferably from 2 to 9, optimally about 3, and M^+ is a
35 sodium, potassium, ammonium or triethanolammonium cation.

Typical commercial co-actives of this variety are listed in the Table below:

Trademark	Chemical Name	Physical Form	Manufacturer
5 Steol CS 330	Sodium Laureth Sulfate	Liquid	Stepan
Standapol ES-3	Sodium Laureth Sulfate	Liquid	Henkel
10 Alkasurf ES-60	Sodium Laureth Sulfate	Paste	Alkaril
Cycloryl TD	TEA Laureth Sulfate	Paste	Cyclo
Standapol 125-E	Sodium Laureth-12 Sulfate	Liquid	Henkel
15 Cedepal TD407MF	Sodium Trideceth Sulfate	Paste	Miranol
Standapol EA-2	Ammonium Laureth Sulfate	Liquid	Henkel

20 Alkyl ether sulfonates may also be employed in the present invention. Illustrative of this category is a commercial product known as Avenel S-150 commonly referred to as a sodium C_{12} - C_{15} Pareth-15 sulfonate.

25 Another co-active type suitable for use in the present invention is that of the sulfosuccinates. This category is best represented by the monoalkyl sulfosuccinates having the formula $RO_2CCH_2CH(SO_3--Na^+)COO--M^+$; and amido-MEA sulfosuccinates of the formula: $RCONHCH_2CH_2O_2CCH_2CH(SO_3--M^+)COO--M^+$; wherein R ranges from C_8 - C_{30} alkyl, preferably C_{12} - C_{15} alkyl and M^+ is a sodium, potassium, ammonium or triethanolammonium cation. Typical commercial products representative of these co-actives are those listed in the Table below:

Trademark	Chemical Name	Physical Form	Manufacturer
Emcol 4400-1	Disodium Lauryl Sulfosuccinate	Solid	Witco
Witco C5690	Disodium Cocoamido MEA Sulfosuccinate	Liquid	Witco
McIntyre Mackanate CM40F	Disodium Cocoamido MEA Sulfosuccinate	Liquid	McIntyre
Schercopol CMSNa	Disodium Cocoamido MEA Sulfosuccinate	Liquid	Scher
Emcol 4100M	Disodium Myristamido MEA Sulfosuccinate	Paste	Witco
Schercopol	Disodium Oleamido MEA	Liquid	Scher
Varsulf S13333	Disodium Ricinoleamido MEA Sulfosuccinate	Solid	Scherex

Sarcosinates may also be useful in the present invention as a co-active. This category is indicated by the general formula $RCON(CH_3)CH_2CO_2^-M^+$, wherein R ranges from C_8 - C_{22} alkyl, preferably C_{12} - C_{18} alkyl and M^+ is a sodium, potassium ammonium or triethanolammonium cation. Typical commercial products representative of these co-actives are those listed in the Table below:

Trademark	Chemical Name	Physical Form	Manufacturer
Hamposyl L-95	Sodium Lauroyl Sarcosinate	Solid	W. R. Grace
Hamposyl TOC-30	TEA Cocoyl/Sarcosinate	Liquid	W. R. Grace

Taurates may also be employed in the present invention as co-actives. These materials are generally identified by the formula $RCONR'CH_2CH_2SO_3--M'$, wherein R ranges from C_8-C_{20} alkyl, preferably $C_{12}-C_{14}$ alkyl, R' ranges from C_1-C_4 alkyl, and M' is a sodium, potassium, ammonium or triethanolammonium cation. Typical commercial products representative of these co-actives are those listed in the Table below:

Trademark	Chemical Name	Physical Form	Manufacturer
Igepon TC 42	Sodium Methyl Cocoyl Taurate	Paste	GAF
Igepon T-77	Sodium Methyl Oleoyl Taurate	Paste	GAF

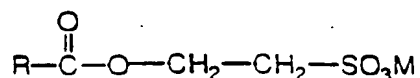
Within the category of amphoterics there are three general categories most suitable for the present invention. These include alkylbetaines of the formula $RN^+(CH_2)_3CH_2CO_2--M'$, amidopropyl betaines of the formula $RCONHCH_2CH_2CH_2N^+(CH_2)_3CH_2CO_2--M'$, and amidopropyl sultaines of the formula $RCONHCH_2CH_2N^+(CH_2)_3CH_2SO_3--M'$ wherein R ranges from C_8-C_{20} alkyl, preferably $C_{12}-C_{14}$ alkyl, and M' is a sodium, potassium, ammonium or triethanolammonium cation. Typical commercial products representative of these co-actives are found in the Table below:

Trademark	Chemical Name	Physical Form	Manufacturer
Tegobetaine F	Cocamidopropyl Betaine	Liquid	Goldschmidt
5 Lonzaine C	Cocamidopropyl Betaine	Liquid	Lonza
Lonzaine CS	Cocamidopropyl Hydroxysultaine	Liquid	Lonza
Lonzaine 12C	Coco-Betaine	Liquid	Lonza
Schercotaine MAB	Myristamidopropyl Betaine	Liquid	Lonza
10 Velvetex OLB-50	Oleyl Betaine	Paste	Henkel

Within the broad category of liquid actives, the most effective are the alkyl sulfates, alkyl ether sulfates, alkyl ether sulfonates, sulfosuccinates, and amidopropyl betaines.

Another preferred surfactant is an acyl isethionate having the formula

20



in which R denotes a linear or branched alkyl group and M denotes an alkali metal or alkaline earth metal or an amine.

Another surfactant which may be used are the monoalkyl or dialkylphosphate surfactants.

30 Another mild surfactant which may be used, preferably used as primary surfactant in combination with other surfactants noted above, is sodium coco glyceryl ether sulfonate. While desirable to use because of its mildness properties, this

coco AGS alone does not provide optimum lather creaminess. A sodium 90/10 coconut/tallow alkyl AGS distribution is preferred for creaminess. Salts other than the sodium salt such as TEA-, ammonium, and K-AGS and chain length distributions other than 90/10 coconut/tallow are usable at moderate levels. Also, some soap may be added to improve lather volume and speed of lathering. Certain secondary co-surfactants used in combination with AGS can also provide a creamier and more stable lather. These secondary surfactants should also be intrinsically mild. One secondary surfactant that has been found to be especially desirable is sodium lauroyl sarcosinate (trade name Hamposyl L, made by Hampshire Chemical).

The amphoteric betaines and sultaines noted above can be used as the sole surfactant, but are more preferred as a co-surfactant. Nonionics generally should not be used as the sole surfactant in this product if high foaming is desirable; however, they can be incorporated as a co-surfactant.

Nonionic and cationic surfactants which may be used include any one of those described in U.S. Patent No. 3,761,418 to Parran, Jr., hereby incorporated by reference into the present application. Also included are the aldobionamides as taught in U.S. Patent No. 5,389,279 to Au et al; and the polyhydroxy fatty acid amides as taught in U.S. Patent No. 5,312,934 to Letton, both of which are incorporated by reference into the present application.

Soaps can be also be used. Preferably, soaps are used at levels of from about 1 to 10 wt % and at higher levels preferably where the surfactant mixture is milder than soap. The soaps may be added neat or made in situ via adding a base, e.g., NaOH; to convert free fatty acids. Preferably,

soaps are only be used as cosurfactants to the extent that the surfactant system is milder than soap alone.

A preferred surfactant active system is one such that acyl isethionate comprises 1 to 15% by weight of the total composition, an anionic other than acyl isethionate (e.g., ammonium lauryl ether sulfate) comprises 1 to 15% by weight of the total composition and amphoteric comprises 0.5 to 15% by weight of the total composition.

Another preferred active system is one comprising 1 to 20% alkyl ether sulfate. Preferred surfactant active systems may also contain 1 to 10% alkali metal lauryl sulfate or C_{12} - C_{16} olefin sulfonate instead of acyl isethionate.

Preferably the surfactant or surfactant system is used in a liquid cleansing formulation having, for example, from about 10% to about 99% water.

The compositions of the invention preferably comprise anionic surfactants which are not nitrogen-containing anionic surfactants.

Moisturizers may include oils, cationic, and certain nonionic and anionic surfactants. Among the moisturizers which may be used are glycerine mono, di and tri-esters, vegetable oil, epidermal and sebaceous hydrocarbons such as lanolin, squalene, cholesterol and derivatives such as esters, mineral oil, silicone gum and silicone oil. One such moisturizer is the dimethicone emulsion sold as Dow Q2-1656, which is a 50% silicone emulsion. Other polyols which may be used include, but are not limited to glycerol, propylene glycol and polyethylene glycol.

Other ingredients such as thickeners like ammonium sulfate and opacifiers such as mica/titanium dioxide may be used. Water, of course, may also be included.

5 The surfactant is preferably present at a level of from 2 to 50 wt.%, especially from 5 to 25 wt.% of the cleansing composition. The moisturizing agent is preferably present at from 0.5 to 35 wt.%, especially from 2 to 20 wt.%.

10 Further additional ingredients which may be employed include preservatives, pH adjusting agents such as citric acid and sodium hydroxide, perfumes, dyes, suspending agents such as magnesium/aluminum silicate, and sequestering agents such as EDTA.

15 The present sponge is preferably readily hand held and preferably does not include a base sheet material, a support block, or indeed, any support material. Particularly is there generally no need for a base sheet of magnetized
20 rubbery polymer as is disclosed for some implements in the prior art. Although the polymeric material of which the sponge is made may be inherently mildly abrasive to the skin, it preferably does not incorporate abrasive particles or a scouring material. Thus, abrasives such as pumice, aluminum
25 oxide, volcanic ash, and silica are preferably omitted. Surfactants which are so harsh that they are not typically used for products designed to wash the skin are best avoided in compositions according to the present invention. Likewise, the sponge should not be ammonia- or oxygen-
30 releasing and preferably does not include bleaching materials.

As a washing system comprising the sponge and the separate cleansing agent, the present invention is distinguished from
35 the many prior art disclosures of sponges and the like which

incorporate surfactants or other ingredients into the sponge itself, whether by impregnation, adsorption, use of ampoules or by mixing with reactants involved in forming the sponge material. Although, some cleansing agent may be incorporated into the sponge provided that some is provided separately, it is preferred that the cleansing agent is entirely separate from the sponge and that essentially no cleansing agent is incorporated in the sponge.

It will be appreciated that the washing implement can take various forms, in addition to that shown in Fig. 1. In Figs. 2 and 3, the implement 10 includes parallel ridges 14 and troughs 15 to assist in the washing function of the sponge. The presence of ridges 14 and troughs 15 results in top and bottom surfaces each in the shape of a sine wave. The ridges are present to function more or less in the same manner as ridges on a washboard.

In Fig. 4, the ridges 16 of sponge 18 extend longitudinally rather than transversely as in Fig. 2. In Fig. 5, the longitudinal, parallel ridges 20 of sponge 22 are not straight, but are wavy. In Fig. 6, the ridges 24 of sponge 26 are transverse as in Fig. 2, but are wavy. In Fig. 7, the ridges 28 are concentric whereas in Fig. 8 ridges 30 are spiral. Ridges 32 can extend above top and/or bottom planar surfaces, 34, 36, respectively, as shown in Fig. 9, wherein troughs are not present. Or, the ridges can be eliminated, as in Fig. 10 wherein only troughs 38 are present.

The surface of the sponge of the invention, ignoring the pores, may include bumps or depressions, i.e., deviations from a regularly curved surface. The depressions may be dish-shaped. It may also be advantageous to use a sponge which is toroidal, i.e., donut-shaped. The toroidal sponge may or may not be textured.

The sponge may be formed by molding. If so, a complex or repeating textured pattern may be etched into the mold to influence either the appearance or the functional sponge surface, or both. Various textured surfaces are available from Mold-Tech of Fairfield, New Jersey. Foams used to make the sponges of the invention, particularly metallocene polyethylene, can be embossed after forming using a heater roller.

10 **EXAMPLE 1** (Prophetic)

The sponge of Figure 1 made of reticulated polyurethane is packaged together with a separate cleansing agent including cleaning and moisturizing ingredients set forth below to form a system. None of the cleansing agent is impregnated or otherwise initially incorporated into the sponge. In one trial, the system is used by placing the washing and moisturizing agent onto the skin of the person washing and then scrubbing with the sponge. In a second trial, the cleansing agent is placed on the sponge and then scrubbing is carried out. In both trials, enhanced lathering results compared to lathering without the use of the sponge.

MOISTURIZING BODY WASH

FULL CHEMICAL NAME OR CTFA NAME	% ACTIVE LEVEL IN FORMULAT ION	TRADE NAME AND % ACTIVE
WATER	TO 100. 00	DEIONIZED WATER
COCAMIDOPROPYL BETAINE	8. 0	TEGOBETAINE F @ 30% (ex Goldschmidt)
SODIUM COCOYL ISETHIONATE	5. 0	JORDAPON CI- ADH @ 86%
DIMETHICONE/LAURETH- 4/LAURETH-23	5. 0	DOW Q2-1656 (50%) SILICONE EMULSION
SODIUM LAURETH SULFATE	2. 0	STANDAPOL ES- 3 @ 28%
AMMONIUM SULFATE	1. 25*	AMMONIUM SULFATE @ 100%
FRAGRANCE	0. 6	
MICA/TITANIUM DIOXIDE	0. 2	TIMIRON MP-30 @ 100%
DMDM HYDANTOIN	0. 2	GLYDANT XL 1000 @ 100%
BHT	0. 0075	BHT@100%
GUAR HYDROXYPROPYLTRIMONIUM CHLORIDE	0. 1	JAGUAR C13S @ -100%

* for viscosity adjustment

EXAMPLES 2-4 (Propnetic)

Example 1 is repeated with a reticulated sponge formed from metallocene polyethylene. Enhanced lathering is obtained compared to lathering without the sponge.

Example 3 is repeated with a non-reticulated sponge formed from metallocene polyethylene. Enhanced lathering is obtained compared to lathering without the sponge.

5 It should be understood of course that the specific forms of the invention herein illustrated and described are intended to be representative only as certain changes may be made therein without departing from the clear teachings of the disclosure. Accordingly, reference should be made to the
10 following appended claims in determining the full scope of the invention.

CLAIMS

1. A system for personal washing comprising a reticulated sponge and a separate cleansing agent suitable for washing human skin.
5
2. A system as claimed in claim 1 wherein said cleansing agent comprises a foaming surfactant, said system optionally further comprising a moisturiser.
10
3. A system as claimed in any of claims 1 or 2 wherein said sponge is formed from one or more synthetic polymers, preferably wherein said sponge is formed from a blend of polymers.
15
4. A system as claimed in any preceding claim wherein said sponge is formed from a material selected from polyurethane, polyester, polyethylene, polyether, polyester base urethane, polyolefins, silicate foams, ceramic foams, latex and natural rubber foams and cellulose and mixtures thereof.
20
5. A system as claimed in any of claims 2-4 wherein the foaming surfactant is selected from cocamidopropyl betaine, sodium cocoylisethionate, soaps, alkyl glyceryl ether sulfates, sulfosuccinates, taurates, sarcosinates, sulfoacetates, alkyl phosphates, acyl lactates, acyl lactylates, and mixtures thereof.
25
6. A system as claimed in claim 1 wherein the conditioner is selected from glycerine mono, di and tri-esters, mineral oil, silicone oil and mixtures thereof.
30

7. A system as claimed in any preceding claim wherein the pore size range of the reticulated sponge is from 10 to about 100 pores per linear inch, preferably from 10 to 60 pores per linear inch.
- 5
8. A system as claimed in any of claims 1-6 wherein the pore size of the reticulated sponge within the range of (i) 40 to 90 cells per square inch, preferably from 40 to 70 cells per square inch or (ii) 91 to 145 cells per square inch, preferably from 100 to 130 cells per square inch; or (iii) 146 to 200 cells per square inch; preferably from 170 to 200 cells per square inch.
- 10
9. A system as claimed in any preceding claim wherein at least one surface of said sponge includes (i) generally parallel ridges; preferably wherein said ridges are combined with troughs to form a sine wave surface, or (ii) generally concentric ridges; or (iii) ridges which form a spiral on said surface; or (iv) ridges extending above said surface; or wherein said sponge includes at least one generally planar surface having troughs extending below the plane.
- 15
- 20
10. A system as claimed in any preceding claim wherein the surfactant is present at a level of from 2 to 50 wt.% of the cleansing agent and the moisturizing agent is present at from 0.5 to 35 wt.% of the cleansing agent.
- 25
11. A system for personal washing comprising a metallocene polyethylene sponge and a separate cleansing agent suitable for washing human skin.
- 30

5

12. A system as claimed in claim 11 wherein said sponge is made from a blend of metallocene polyethylene and one or more additional polymers, preferably wherein said sponge is reticulated.

10

13. A system as claimed in claim 1 which is a lamination of 2 or more layers of sponge, each layer having a different pore size.

1 / 3

Fig.1.

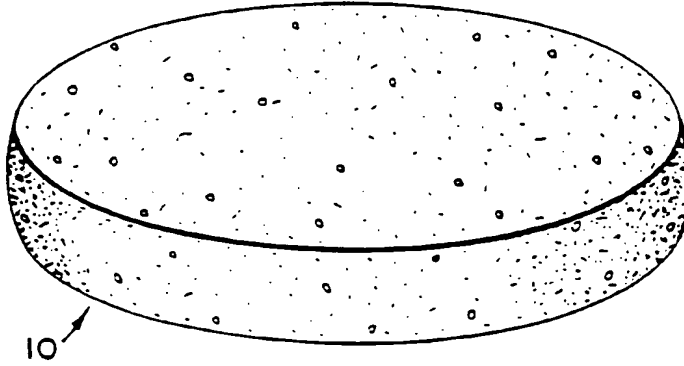


Fig.2.

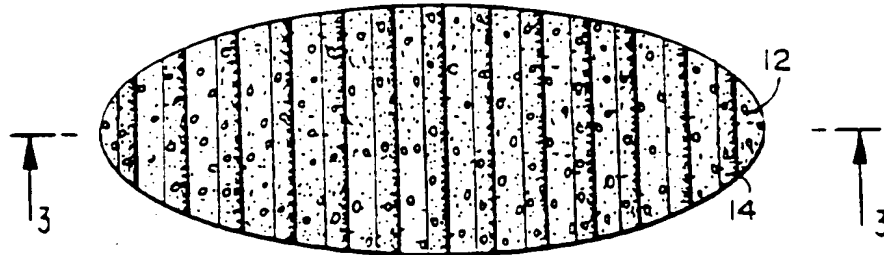


Fig.3.

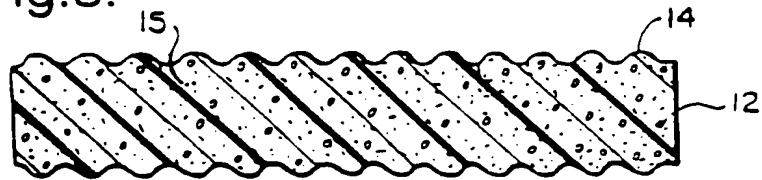


Fig.4.

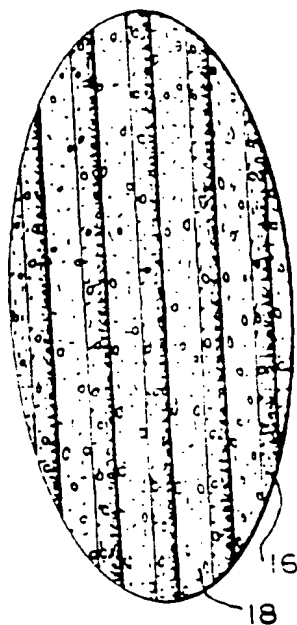


Fig.5.

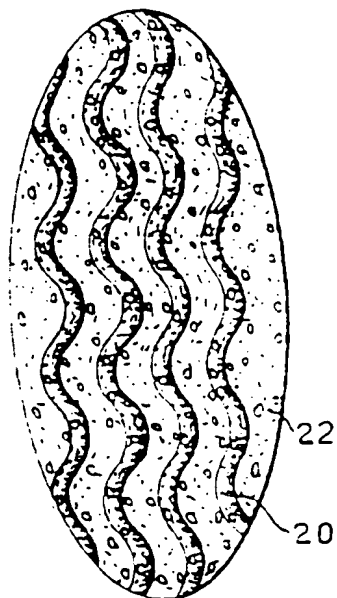


Fig.6.

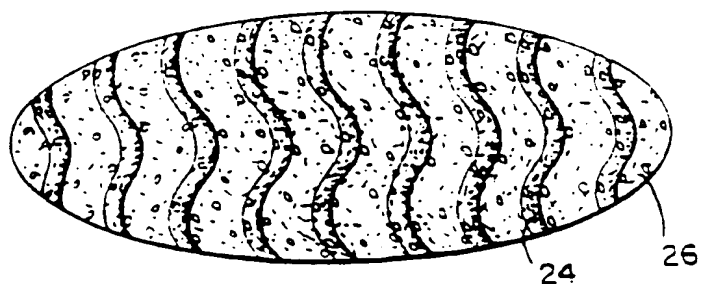


Fig.7.

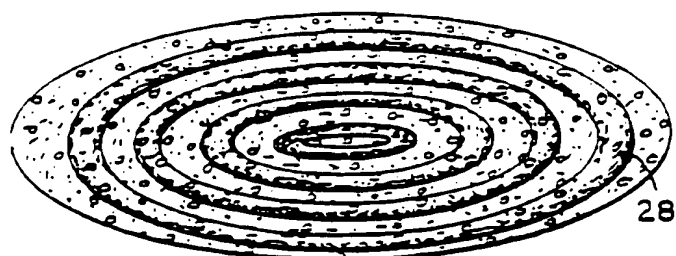


Fig.8.

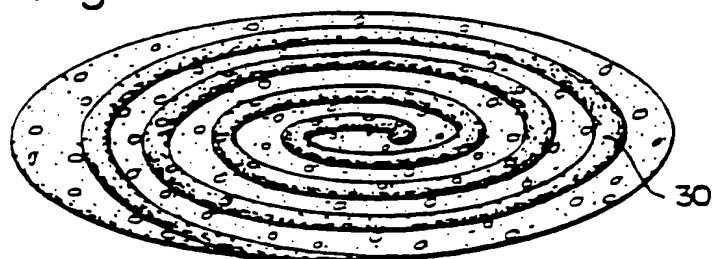


Fig.9.

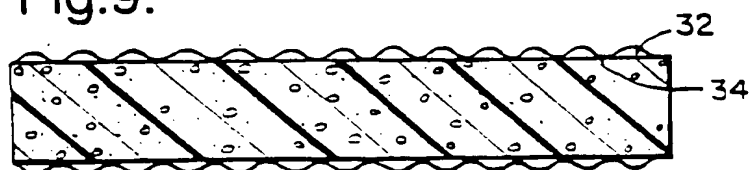
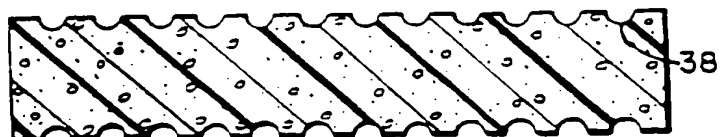


Fig.10.



INTERNATIONAL SEARCH REPORT

Int. Application No
PCT/EP 96/05007

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 A47K7/02

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 6 C08L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US,A,4 925 327 (WIRT) 15 May 1990 see column 1, line 17 - line 35 see column 2, line 44 - line 64 see column 3, line 14 - line 54 see column 4, line 10 - line 51 see column 7, line 9 - line 41; figures	1,3,4
A	---	7
Y	US,A,4 183 684 (AVERY) 15 January 1980 cited in the application see column 1, line 5 - line 13 see column 4, line 55 - column 5, line 20 see column 6, line 18 - line 27; figures --- -/--	1,3,4

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents:

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

T later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

X document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

Y document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

A document member of the same patent family

2

Date of the actual completion of the international search

16 January 1997

Date of mailing of the international search report

24.01.97

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Authorized officer

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INTERNATIONAL SEARCH REPORT

International Application No
PCT/EP 96/05007

C/(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>DATABASE WPI Week 9540 8 August 1995 Derwent Publications Ltd., London, GB; AN 95309216 XP002022813 & JP,A,07 207 054 (SEKISUI CHEM IND CO) see abstract</p> <p>---</p>	11,12
A	<p>EP,A,0 194 097 (THE PROCTER & GAMBLE CO) 10 September 1986 see the whole document</p> <p>---</p>	2,5,6,10
A	<p>US,A,4 866 806 (BEDFORD) 19 September 1989 cited in the application see column 1, line 55 - column 3, line 30; figures 1,2</p> <p>---</p>	9,11,13
A	<p>US,A,4 415 288 (GORDON & AL) 15 November 1983</p> <p>---</p>	
A	<p>US,A,4 880 111 (BAGWELL & AL) 14 November 1989</p> <p>---</p>	
A	<p>FR,A,2 353 205 (LORCH) 23 December 1977</p> <p>-----</p>	

INTERNATIONAL SEARCH REPORT

International application No.

PCT/EP 96/05007

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see annex

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☒ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

information on patent family members

Int. onal Application No
PCT/EP 96/05007

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US-A-4415288	15-11-83	US-A- 4507111 US-A- 4498796	26-03-85 12-02-85
US-A-4880111	14-11-89	NONE	
FR-A-2353205	23-12-77	NONE	

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